

# Nutramara conference: Arnessing Marine Bioresources for Innovations in the Food Industry

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# Bioactive compounds in some autotrophic microalgae grown on industrial process water

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## Introduction:

Microalgae can be a new source of bioactive compounds in food and feed industry. Not only the fatty acids and amino acids, but also other bioactive compounds including the phenolic, carotenoid and tochopherol composition of the micro algae biomass are important when selecting the algae species to be used as ingredients for the production of fish feed. The present study is part of FIMAFY project, which aims at using industrial process water as the main nutrient source and also at developing new processing technologies to produce microalgae-biomass as an alternative valuable resource in fish feed.

## Sample preparation and methods of analysis

Microalgae species of fresh water and salt water origin including *Nannochloropsis, Desmodesmus*, *Chlorella ,Dunaniella and Phaeodactylum* were cultivated in different ratios of industrial process water and fresh water.

All species were harvested in constant growth rate by using pilot scale tubular ceramic membrane unit and then freeze dried immediately.

Compositions of pigments (HPLC-DAD), fatty acids (GLC-FID), amino acids (LC-MS),phenolic compounds (HPLC-DAD and HPLC-ESI-QTOF-MS),tochopherols (HPLC-DAD) were determined in the biomass

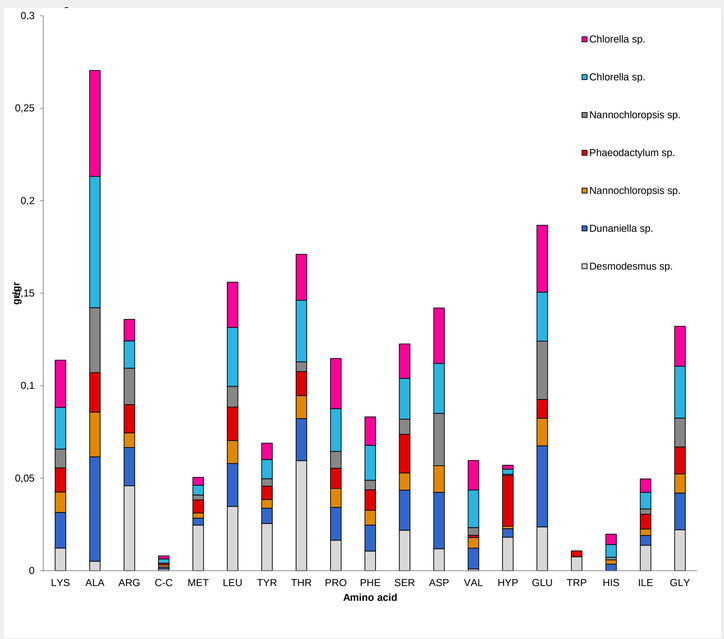


Fig 1-Amino acid composition

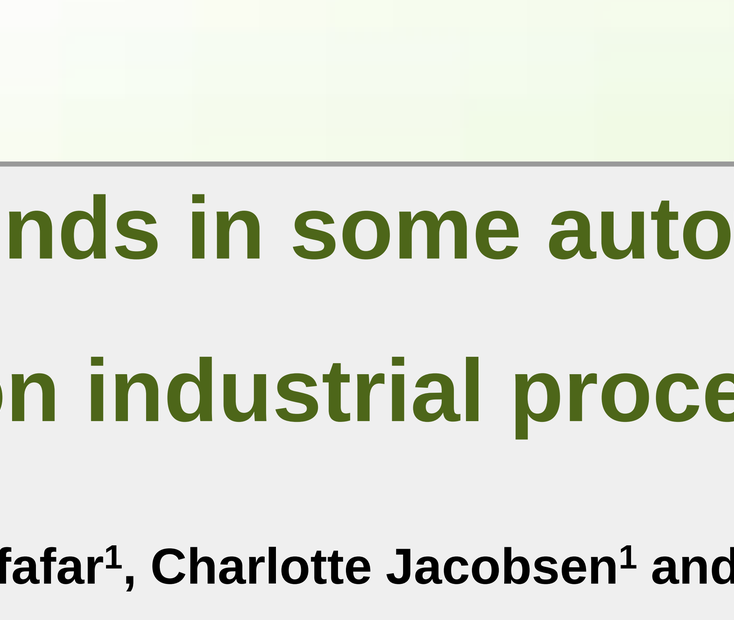


Fig 2- Fatty acid composition

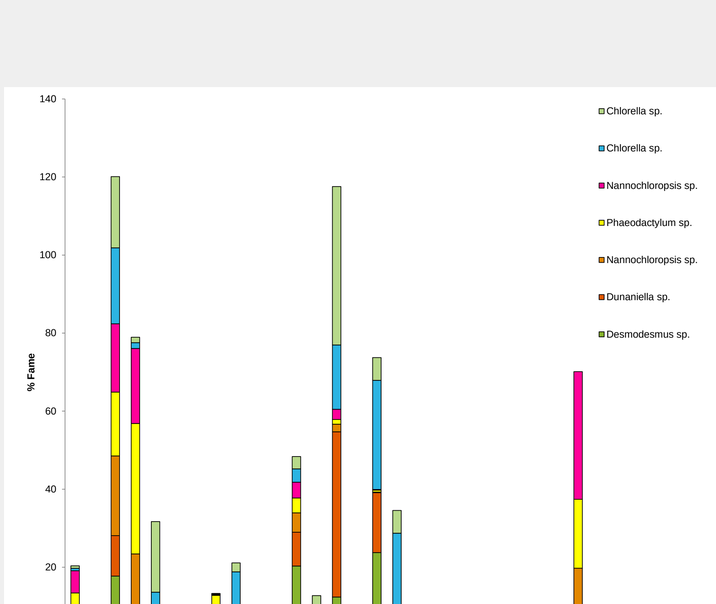


Fig 3- Tochopherols

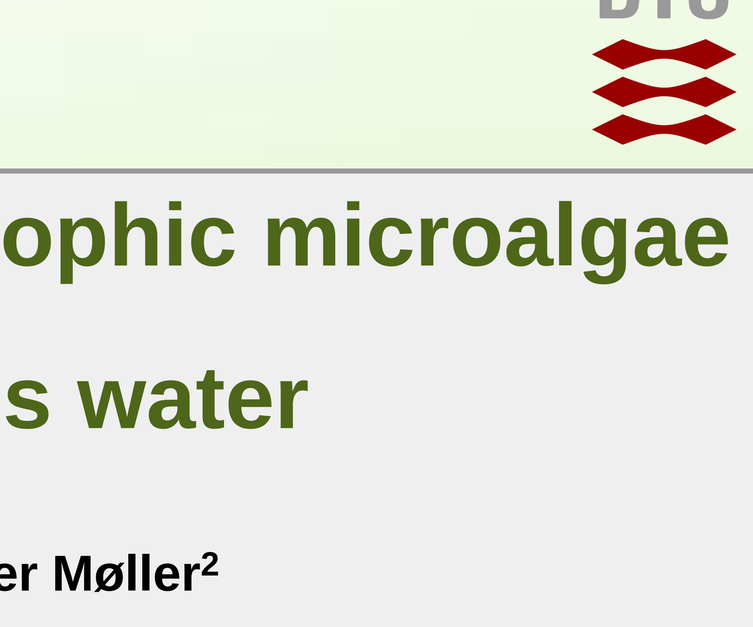


Fig 4- Pigments

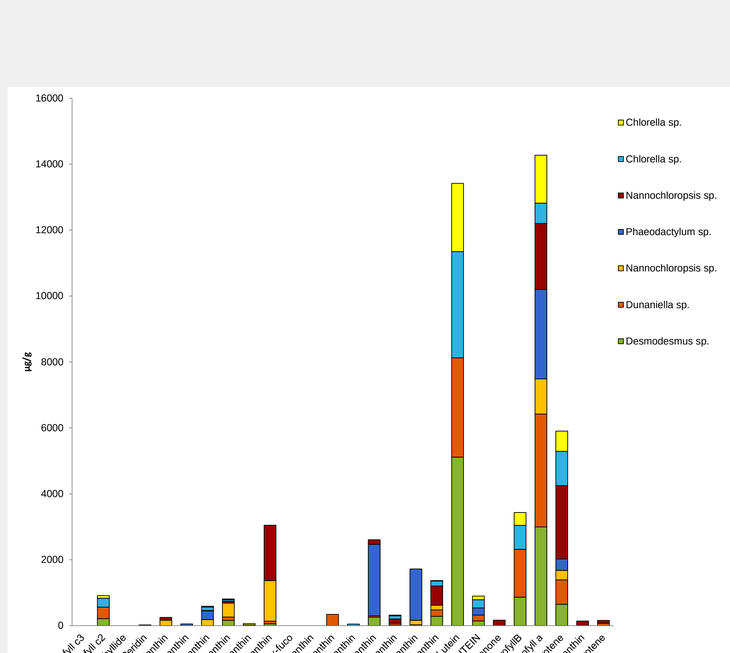


Fig 5- Phenolic compounds

## Discussion :

Composition of fattya acid and pigments varied between different species while amino acid and phenolic compounds shown similar profiles.Tochols mostly include alpha tochopherol . *Desmodesmus* sp. and Chlorella could grow on industrial wastewater as the main nutrient source and produce proper amounts of proteins and carotenoids (Lutein) while cultivation of *Nannochloropsis* sp. on a fortified growth media including industrial waste water resulted in considerable amounts of oil and EPA (C20:5ω3) in the harvested biomass. Considerable amounts of alpha tochopherol was detected in biomass of Dunaniella sp. grown on industrial waste water

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## Conclusion:

Cultivation of microalgae on waste water is a sustainabe ,and economically feasible method for production of bioactive compounds such as amino acids, fatty acids, natural antioxidants and pigments. Nutrient composition and concentration of the growth media has an important effect on the bioactive composition of microalgae biomass.